Water Laboratory Analyst Need to Know

Laboratory Tests

Water laboratory analysts need to be familiar with the following laboratory tests:

Group 1 Tests

- Acidity
- Alkalinity
- Chlorine
- Color
- Conductivity
- Fecal Coliform Bacteria
- Fluoride
- Hardness
- Nitrate/Nitrite
- pH
- Phosphorus
- Temperature
- Threshold Odor
- Total Coliform Bacteria
- Total Dissolved Solids
- Total Suspended Solids
- Turbidity

Group 2 Tests

- Haloacetic Acids
- Metals (including dissolved metals)
- Organics
- Total Trihalomethanes

For Group 1 Tests and Group 2 Tests, the analysts need to know:

- Basic definition of the test
- How to properly collect the sample
    - What type of sample to collect (grab or composite)
    - What type of container to use for collecting the sample
    - Where to collect the sample
- The regulatory-approved preservation technique for the sample
- The regulatory-approved holding time for the sample
- How the results of the test should be expressed
- How the results should be reported to the State
- Applicable MCLs

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For Group 1 Tests, analysts also need to know:

- How to properly analyze the sample
  - Where to find the regulatory-approved method for analysis
  - Regulatory-approved method for analysis
  - Step-by-step procedure for analyzing the sample
  - Name and purpose of reagents and materials used in the analysis
  - What apparatus and equipment is used in the analysis
  - Potential interferences
  - What can be done to prevent interferences
- How to perform any calculations associated with the analysis
- What Quality Assurance/Quality Control measures should be taken

Laboratory Apparatus and Equipment

Wastewater laboratory analysts need to be familiar with the following laboratory apparatus and Equipment:

- Autoclaves
- Balances
- Buret
- Computers
- Conductivity Meters
- Desiccators
- Digestion Apparatus
- Distillation Apparatus
- Drying Ovens
- Incubators
- Ion Selective Electrodes
- Fume Hoods
- Laboratory Glassware
- Microscope
- pH Meters
- pH Probes
- Spectrophotometer
- Thermometer
- Turbidimeter
- Volumetric Glassware
- Waterbath
- Water Purification Equipment

For the preceding laboratory apparatus and equipment, analysts need to know:

- Which laboratory tests use the apparatus or equipment
- How to operate the apparatus or equipment
- Frequency and procedure for calibrating the apparatus or equipment
- How to maintain the apparatus or equipment
- Frequency and procedure for cleaning the apparatus or equipment
- How to properly store the apparatus or equipment
- Basic theory behind how the equipment operates
- How to troubleshoot the equipment

Basic Laboratory Procedures

Wastewater laboratory analysts need to be familiar with the following basic laboratory procedures:

- Digestion
- Dilution
- Distillation
- Filtration
- Mixing
- pH Adjustment
- Preparing laboratory pure water
- Reagent addition and preparation
- Sample concentration
- Sterilization
- Temperature adjustment

For the preceding basic laboratory procedures, analysts need to know:

- A definition of the term(s)
- How to perform the procedure
- Name and purpose of materials and reagents used in the procedure
- What apparatus and instruments are used to perform the procedure
- How to perform calculations associated with the procedure

Quality Assurance and Quality Control

Wastewater laboratory analysts need know how to perform the following Quality Assurance and Quality Control procedures:

- Develop, maintain, and interpret control charts
- Establish method detection limits and reporting limits
- Prepare calibration curves

- Establish quality assurance plans
- Maintain training records
- Perform corrective actions
- Conduct proficiency tests
- Validate data
- Record data
- Determine significant figures

Chemicals and Wastes

Wastewater laboratory analysts need to know the following about chemicals and wastes:

- What types of chemicals are used in each analysis
- How to prepare chemical reagents
- How to store chemicals
- How to determine quantity to purchase
- What personal protective equipment to use when handling a specific chemical
- How to properly dispose of chemicals
- How to dispose of biohazardous waste
- How to properly label chemicals

Laboratory Safety

Wastewater laboratory analysts need to be familiar with safety aspects involving the following:

- Chemical storage
- Fire extinguishers
- Fume hoods
- Acids
- Bases
- Oxidizers
- Personal protective equipment
- Eyewashes
- Safety showers
- Burns
- Confined spaces
- Infectious material
- Chemical spills
- Material Safety Data Sheets (MSDS)
- OSHA regulations

Water Laboratory Analyst Need to Know

Definitions

Water laboratory analysts need to know the definitions of the following terms:

- 95% confidence level (a statistical term)
- Acid
- Accuracy
- Action level
- Adsorption
- Anhydrous
- Atomic weight
- Base
- Buffer
- Catalyst
- Chain-of-Custody
- Digestion
- Disinfection
- Distillation
- Duplicate, or Replicate sample
- Fecal coliform bacteria
- Grab sample
- Inorganic
- Laboratory pure water
- Maximum Contaminant Level (MCL)
- Method Detection Limit (MDL)
- Molarity
- Molecular weight
- Nitrification
- Normality
- Organic
- Precision
- Primary Drinking Water Standards
- Secondary Drinking Water Standards
- Standard Operating Procedures
- Solute
- Specific gravity
- Sterilization
- Surrogate standard
- Titrant
- Titration
- Waste minimization

Water Laboratory Analyst Need to Know

Math

- Temperature conversions (^{O}C to ^{O}F and ^{O}F to ^{O}C)
- Volume calculations
- Dosage (in pounds) calculations
- Normality calculations
- Percent calculations